federal register

Tuesday
November 27, 1979

Part V

Environmental Protection Agency

Standards of Performance for New Stationary Sources: Sewage Treatment Plants; Review of Standards

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[FRL 1310-3]

Standards of Performance for New Stationary Sources: Sewage Treatment Plants; Review of Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION Review of standards.

SUMMARY: EPA has reviewed the standards of performance for sewage treatment plant sludge incinerators (40 CFR 60.150). The review is required under the Clean Air Act, as amended August 1977. The purpose of this notice is to announce EPA's plan to defer decision on the need to revise the standards and to undertake a program to further assess emission rates, control technology, and the current standard.

DATES: Comments must be received by January 28, 1980.

ADDRESS: Comments should be submitted to the Central Docket Section (A-130), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460, Attention: Docket No. A-79-17.

FOR FURTHER INFORMATION CONTACT: Mr. Robert Ajax, telephone: (919) 541-5271. The document "A Review of Standards of Performance for New Stationary Sources—Sewage Sludge Incinerators" (EPA-450/3-79-010) is available upon request from Mr. Robert Ajax (MD-13), Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

SUPPLEMENTARY INFORMATION:

Background

Prior to the promulgation of the NSPS in 1974, most sewage sludge incinerators utilized low pressure scrubbers (2 to 8 in. WG) to reduce emissions to the atmosphere. These scrubbers were designed to meet State and local standards that were on the order of 0.2 to 0.9 grams/dry standard cubic meter (dscm) or 0.1 to 0.4 grains/dry standard cubic foot (dscf) at 50 percent excess air. Incineration standards, for the most part, reflected general incineration of all types with emphasis on municipal solid waste. A separate standard for sewage sludge incineration emissions was unusual. Control efficiencies, based on an uncontrolled rate of 0.9 grains/dscf, were between 50 and 90 percent.

In June of 1973, the Environmental Protection Agency proposed a standard under Section 111 of the Clean Air Act to control particulate matter emissions from sewage sludge incinerators. The standard, promulgated in March 1974 and amended in November 1977, applies to any incinerator constructed or modified after June 11, 1973, that burns wastes containing more than 10 percent sewage sludge (dry basis) produced by municipal sewage treatment plants, or charges more than 1000 kg (2205 lb/day) municipal sewage sludge (dry basis). The standard prohibits the discharge of particulate matter at a rate greater than 0.65 grams/kg of dry sludge input (1.30 lb/ton) and prohibits the discharge of any gases exhibiting 20 percent opacity or greater.

The Clean Air Act Amendments of 1977 require that the Administrator of the EPA review and, if appropriate, revise established standards of performance for new stationary sources at least every 4 years [Section 111(b)(1)(B)]. This notice announces that EPA has undertaken a review of the standard of performance for sewage sludge incinerators and sets forth initial findings based on this review. EPA is however, deferring a final decision on the need to revise the standard until further data can be obtained and analyzed pertaining to the form of the standard, parameters affecting emission rates, and coincineration. Comments on these findings and this action are invited.

Findings

Status of Sewage Sludge Incinerators

It is estimated that approximately 240 municipal sludge incinerator units are presently in operation. A large number of incinerators were built in the 1967-1972 period and this growth has continued, although at a somewhat slower rate since 1972. A compilation of incinerator units subject to the construction grants program indicated that 92 new units were either in the contruction or planning stages in mid-1977. A total of 23 sludge incinerators have been identified which are subject to the standard and which have been tested for compliance.

Emission Rates and Control Technology

Particulate matter from the inert material in sludge is present in the flue gas of sewage sludge incinerators. Uncontrolled emissions may vary from as low as 4 g/kg (8 lb/ton) dry sludge input to as high as 110 g/kg (220 lb/ton) dry sludge input depending upon the incinerator type and the sludge composition (e.g., percent volatile solids, percent moisture, and source treatment). Since adoption of the standard, wet scrubbers operating with pressure drops in the range of 7 to 32 in. WG and a mean of 20 in. WG have been employed exclusively and have been successful for controlling emissions to the level required by the standard. The average emission from tests of 26 facilities since 1974 was 0.55 g/kg with a standard deviatin of 0.35 g/kg (1.1 ±0.7 lb/ton) dry sludge input. When tests from one obviously underdesigned facility and three facilities not subject to the standard were deleted, the average emission was 0.45 g/kg with a standard deviation of 0.17 g/kg (0.91 ± 0.33 lb/ton) dry sludge input or about 30 percent below the standard. The scrubber configurations which were employed included three-stage perforated plate impingment scrubbers operating at 7 to 9 in WG and venturi scrubbers, or venturi scrubbers in series with various impingment plate scrubbers operating in the 9 to 32 in. WG range.

While these test results are consistent with the standard, an analysis of the test results shows an inconsistent relationship between scrubber pressure drop and emissions as expressed in units of the standard. This appears to be due to both the facility type and input sludge composition, particularly solids content. Moreover, experimental data from some of the tested units suggest that incinerators burning sludge below 20 percent solids may have difficulty complying with the NSPS. Because combustion air requirements per unit of dry sludge increase with increasing sludge moisture, actual stack volume concentrations of 0.01 grains/dry standard cubic meter or less are needed to meet the standard when high moisture sludges are incinerated. For example, two incinerators burning sludges of 16 percent solids achieved only marginal compliance and low volume concentrations of 0.009 and 0.010 grains/acf.

An additional finding based on an analysis of the test data which are now available concerns the relationship between emissions expressed in terms of grain loading on a dry basis and emissions per weight of dry sludge burned. As initially proposed, the standard was expressed as a volume concentration standard equal to 0.031 grains/dscf. Due to comments received relative to the use of dilution air and the difficulties involved in measuring and correcting to dry volume, the promulgated standard was established at 1.3 lb/dry ton sludge input. This was based on data available at the time of promulgation showing that the promulgated and proposed standards were equivalent. However, an analysis

of the data which are now available indicate a nominal equivalence between 1.8 lb/ton dry sludge and 0.031 grains/dscf for typical sludges.

One factor at least partially responsible for the difference in equivalent emission factors, in addition to affecting the relationship between pressure drop and mass emissions, is the moisture content in the input sludge. The average solids content of the sludge associated with the data cited above is 24 percent. However, tests of two other facilities with input sludge having a relatively high solids content of between 27 and 33 percent showed an equivalence similar to that found by EPA in 1973 (e.g., 0.03 grains/dscf equivalent to 1.3 lb/ton dry sludge input).

Opacity levels from successful emissions tests never exceeded 15 percent and were most often either 0 or 5 percent. These results are similar to those found when the standard was first proposed as a 10 percent value with exceptions allowed during 2 minutes of a 60 minute test cycle. This standard was changed to 20 percent with no exemptions except during startup, shut down, or malfunctions. The current data indicate that the rationale used to arrive at the 20 percent opacity level till applies. This rationale, in addition to field observations obtained with Method 9, involved instrumental data and theoretical projections of the opacity which could, under extreme conditions, occur at a facility complying with the particulate matter standard. A reevaluation of this standard was undertaken and reaffirmation was announced in the Federal Register on February 18, 1976.

Application of the Standard to Coincineration

The coincineration of municipal solid waste and sewage sludge has been practiced in Europe for several years, and on a limited scale in the U.S. However, as energy resources become scarce and more costly, and where land disposal is economically or technically unfeasible, the recovery of the heat content of dewatered sludge as an energy source will become more desirable. Due to this and the institutional commonality of these wastes and advances in the preincineration processing of municipal refuse to a waste fuel, many communities may find joint incineration in energy recovery incinerators an economically attractive alternative to their waste disposal problems.

Coincineration of municipal solid waste and sewage sludge, as described above, is not explicitly covered in 40 CFR 60. The particulate standard for municipal solid waste described in Subpart E (0.18 g/dscm or 0.08 g/dscf at 12 percent CO_2) applies to the incineration of municipal solid waste in furnaces with a capacity of at least 45 Mg/day (50 tons/day). Subpart O, the particulate standard for sewage sludge incineration (0.65 g/kg dry sludge input or 1.3 lb/ton dry sludge), applies to any incinerator that burns sewage sludge, with the exception of small communities practicing coincineration.

To clarify the situation when coincineration is involved, EPA adopted the policy that when an incinerator with a capacity of at least 45 Mg/day (50 tons/day) burns at least 50 percent municipal solid waste, then the Subpart E applies regardless of the amount of sewage sludge burned. When more than 50 percent sewage sludge and more than 45 Mg/day (50 tons) is incinerated, the standard is based upon Subpart O or, alternatively, a proration between Subparts O and E. The proration scheme, however, has a discontinuity when a municipal incinerator burns 50 percent solid waste.

The alternative of prorating the Subparts E and O is not straightforward, since the two standards are stated in different units. The proration scheme requires a transformation of the municipal incineration standard (Subpart E) from grams per dry standard cubic meter (grains per dry standard cubic foot) at 12 percent CO_2 to grams per kilograms (pounds per dry ton) refuse input, or a transformation of the sewage sludge standard (Subpart O) from grams per dry kilograms (pounds per dry ton) input to grams per dry standard cubic meter at 12 percent CO_2. Such transformations are dependent on the percent CO_2 in the flue gas stream, the stoichiometric air requirements, excess air, the volume of combustion products to require air, and percent moisture in refuse or sludge, and the heat content of the sludge and solid waste.

Other Pollutants

Incineration of sewage sludge results in the emission to the atmosphere of trace elements and compounds, some of which are hazardous or potentially hazardous. Substances of concern include mercury, lead, cadmium, pesticides, and organic matter. Among these, mercury emissions from sewage sludge incinerators are specifically limited under the National Emission Standards for Hazardous Air Pollutants (40 CFR 61.50 et seq.).

The emission of other trace compounds and elements, while not subject to specific limitations is controlled by particulate matter control equipment or directly by the high temperatures in the combustion process and with the exception of cadmium, no data were obtained during this review to indicate a need for specific limitations on emissions of these materials resulting from incineration of typical sludges. Tests have shown high destruction efficiencies for pesticides, and organics in sewage sludge incinerators. Similarly, test data suggest that high pressure scrubbers of the type normally employed to meet the particulate standards also reduce lead emissions to below the level required to meet ambient standards. In contrast, data suggest that cadmium emissions may not be adequately controlled. A separate program is underway in EPA to independently assess the need to regulate cadmium. Final decisions on this will be announced in a separate action. In the event that the need to limit cadmium emissions from sewage sludge incinerators is indicated, appropriate action will be taken.

Conclusions

The available test data support the validity of the standard. However, the marginal compliance of several facilities operating with high pressure drops, the apparent relationship between sludge moisture content and emission rates, and the inconsistent relationship between pressure drop and scrubber performance as measured in terms of the standard are matters which require further study. Such a study will be undertaken later and will include further analysis of data regarding sludge dewatering, incinerator types, control technology, and the relationship between control device operating parameters, sludge solids content, emission rates, and alternative forms for expression of emission rates. This will also include an analysis of alternative means for establishment of standards applicable to coincineration. A final conclusion on the need for revision of the standard will not be made until this study is complete.

Dated: November 16, 1979.

Barbara Blum,

Acting Administrator.

[FR Doc. 79-36473 Filed 11-26-79; 8:45 am]

BILLING CODE 6560-01-M